

PATENT ABSTRACTS OF JAPAN

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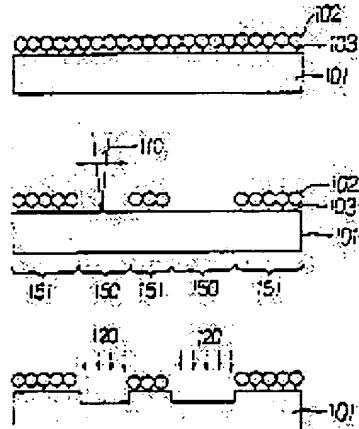
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(54) MANUFACTURE OF SEMICONDUCTOR ELEMENT

(57)Abstract:

PURPOSE: To obtain a fully rapid etching rate without inducing damage to a semiconductor wafer by irradiating charged particles into the semiconductor wafer which is introduced into vacuum from air and then allowing a reaction gaseous substance to contact this irradiation region.

CONSTITUTION: There are a large amount of oxygen or carbon atoms or an absorbate 102 due to molecule on the surface of a semiconductor substrate 101 introduced from air. If an electron beam is irradiated within a high vacuum such as an etching chamber, a semiconductor molecule on the surface of the semiconductor substrate is excited, thus enabling the absorbate and a bond 103 to be cut easily. Then, when a chlorine gas 120 is irradiated to the semiconductor substrate 101, normal reaction between the chlorine gas and GaAs advances on the surface of the semiconductor substrate at a region 150 where electron beam is irradiated. That is, the surface absorbate 102 functions as a mask with the thickness equal to that of an atom layer and etching advances only at the region 150 where an electron beam 110 is irradiated. Thus, there is no damage to the semiconductor substrate and a sufficient etching rate can be obtained.



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